



Visiting Mangroves

Many MPA visitors have never experienced a mangrove forest and have no knowledge of this unique, generally muddy, environment. Walks at low tide, snorkeling and boat trips at high tide, and best of all an elevated boardwalk are good ways to experience the forest. This sheet provides advice on how to visit mangroves, whether for educational or recreational purposes, and on how to build and manage a boardwalk.

WALKS, SNORKELLING AND BOAT TRIPS

Fiddler crabs, mud skippers, wading birds and other foraging birds are just some of the inhabitants that can be encountered in most mangrove forests at low tide. In many countries, local fishers and villagers make footpaths through mangroves to allow access, and these can often be incorporated into a low tide shore walk. Alternatively, new paths can be designed, perhaps with the addition of gravel or stone to consolidate the mud. Loops in paths can be included to route users through interesting areas (e.g. into a *Rhizophora* part of the forest), returning the walker to the main path further along. Damage to trees, interference with natural drainage patterns, and disturbance of the fauna should be avoided when making paths.

Snorkeling can be a rewarding experience preferably during slack high tide when the water is clear, and activities of fish and invertebrates can be observed. Clear water is usually found only in a few areas, e.g. in small inlets or on offshore islands, away from large sediment-rich rivers. Care should be taken to avoid damaging branches and pneumatophores (aerial roots), as well as personal injury from attached oysters and barnacles.

Irrespective of water clarity, boat trips through mangrove forests at high tide are an enjoyable and comfortable way of viewing trees, birds and often fish. Paddle canoes are best; motorized vessels should try to keep noise levels down and minimize pollution from fuel.

MANGOVE BOARDWALKS

Walking through the mangroves along a purpose-built platform or boardwalk is the simplest, safest and most accessible for visitors. Walkways (usually made of wooden boards) provide footpaths over water and mud allowing easy access at high or low tide. The deck provides access for pedestrian, as well as cyclists, wheelchairs and children's pushchairs.



Visiting Coral Reefs

SUBA DIVING AND SNORKELLING

Divers and snorkelers can cause damage by breaking corals, stirring up sediment, and disturbing animal life. Coral breakage is the main problem, caused by poor buoyancy control, careless kicking with fins, and standing on the reef. Underwater photographers and novice divers may have greater impact but experienced divers may also break corals as they tend to swim closer to the reef. However, research suggests that most divers and snorkelers have little negative impact and there is no evidence that they cause declines in coral diversity or abundance.

Many MPAs have codes of practice or guidelines for divers and snorkelers. For example, in Brazil, guidelines were produced through a national workshop. Dive boat operators using an MPA should be required to implement best practices. These include: securing trailing equipment, such as gauges, and making buoyancy checks at the beginning of a dive; discouraging use of gloves to deter divers from touching marine life; and carrying out practice activities (e.g. mastering buoyancy control, snorkeling for beginners) away from coral. Novices should always be with someone experienced. Good briefings before visitors enter the water have been shown to reduce damage to coral reefs and should be made obligatory. If a beach entry is necessary, provide an access point away from corals. Monitor the impact of divers and snorkelers and limit numbers, if coral breakage or other disturbances increases (see sheet J2).

UNDERWATER TRAILS

Underwater trails, whether guided or not, provided added value for visitors. These must be designed so that they do not concentrate people at fixed points, thus causing damage. On the Great Barrier Reef marine Park, rest stations (e.g. poles and floating inner tubes that snorkelers can hold on to) have been installed. If underwater signs are used, they should be placed in areas of sparse coral cover or on sandy bottoms. They are often difficult to read, particularly for those who cannot duck dive, and need regular cleaning of algae and other fouling organisms; numbered markers, with portable waterproof information sheets explaining each point, may be a better means of providing information. Visitors should be briefed in advance about the trail, and visitor numbers and group size may need to be limited occasionally or the trail periodically closed to aid recovery. Trails should be sited away from waves and strong currents for safety reasons, and in water sufficiently deep to avoid fin damage but shallow enough to provide good viewing; a minimum depth of 2.2m is recommended.

REEF WALKING

If an environmentally sound trail can be established over a reef flat, it can provide an enjoyable and educational activity, particularly for visitors who may not wish to snorkel or dive. However reef walking should be discouraged if it will cause damage by trampling. The impact can be minimized if the trail is sited on existing routes (e.g. those used by fishers), sand channels, and areas without living coral. It should be marked and visitors should be required to walk in single file and not stray. They should have suitable footwear, and use a pole for balance (but this must not be used to poke animals). If an organism is picked up for interpretation, it should be returned to the same place; organisms attached to the reef surface should not be removed.



FISH WATCHING AND FEEDING

Colorful reef fish and large 'charismatic' open water fish are always popular with visitors, and some can be observed underwater or from glass bottom boats. Identification guides add to a visitor's enjoyment, and many divers like to participate in monitoring programs (see sheet D3). Fish feeding, to increase numbers and activity, should be discouraged as it disrupts normal behavior,, sometimes making fish aggressive and altering their diets. If considered necessary, it should take place away from areas used for fishing or research and not when people are in the water. It should be done only by trained personnel, the food should be thrown rather than fed directly by hand, and only raw fish or fish pellets in limited amounts (max. 1 kg/day/site) should be used.

GLASS BOTTOM BOATS

The greatest risk from glass bottom boats is physical damage to corals from anchoring or operating in shallow water. Boatmen should be trained and must understand the importance of avoiding corals, boats must be well maintained (see sheet F5), and mooring buoys should be installed near popular reef viewing areas (see sheet F9).

Source: Managing Marine Protected Areas: A Toolkit for the Western Indian Ocean